OVERVIEW OF PLASMA RESEARCH AT THE GLOBUS-M2 SPHERICAL TOKAMAK [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2023.50.2023.1.1.005

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An overview of the results obtained at the Globus-M2 spherical tokamak [1] by 2023 is presented. The experiments were carried out with a toroidal magnetic field up to 0.9 T and a plasma current up to 0.44 MA (90% of the maximum design values). For the first time in the discharges with neutral beam injection (deuterium, 30 keV, 0.7 MW), heating of ions above 4 keV was observed [2]. The electron temperature was 1.5 keV at an average plasma density of 5×1019 m-3 and higher. In experiments on non-inductive current drive electromagnetic waves of the lower hybrid frequency range (2.45 GHz) were launched using both toroidally and poloidally oriented grill. The fraction of non-inductive current exceeded 50% in a discharge with a total current of 0.25 MA for both cases. The achieved efficiency values *η*≈(0.2-0.4)×1019 A m-2 W-1 are comparable with the results obtained at conventional tokamaks. Thermal conductivity analysis based on experimental data was performed using the ASTRA 7.0, NCLASS, SPIDER, NUBEAM codes and the 3D Fast Ion Tracking algorithm. Scaling for spherical tokamaks, showing a strong dependence of the energy confinement time on the magnetic field and a moderate dependence on the plasma current (*τ*EGLB~ *I*p0.43*B*T1.19), has been confirmed for magnetic fields up to 0.8 T. The results of recent experiments on the influence of Alfvén modes on the confinement of fast particles are also presented. A separate section is devoted to the development of diagnostics.

The concept of next-generation compact spherical tokamak (project Globus-3) [3] is presented. In such a facility, the duration of the plasma discharge should exceed the characteristic time of formation of stationary plasma profiles. The main features of the tokamak are a long pulse, a strong toroidal magnetic field, and powerful auxiliary plasma heating, which make it possible to consider it as a hydrogen prototype of a neutron source.

The work was carried out at the Unique Scientific Facility ‘Spherical tokamak Globus-M’, which is incorporated in the Federal Joint Research Center ‘Material science and characterization in advanced technology’ within the framework of the state contracts of the Ioffe Institute (0034-2021-0001 and 0040-2019-0023).

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/R/ru/KN-Minaev.docx) [↑](#footnote-ref-1)